

Name: _____ Group: _____ Mark: _____ /50 Grade: _____

Answer all questions.

1. (a) An operating system is required to manage interactions between the user, the application software and the hardware. Describe **three** functions the operating system provides. [6]

- (b) The operating system may use a paging table. Explain what is meant by a paging table is and why it is necessary. [2]

If the demands for memory within a system exceed the available RAM, an area of the hard drive can be designated as virtual memory to cope with the demand.

- (c) Explain why using virtual memory is not as effective as adding more RAM. [2]

2. (a) The CPU must be able to process interrupts. State how a CPU determines if an interrupt has been raised. [2]

- (b) Explain how it is possible for a single processor to appear to be multi-tasking. [2]

(c) What are the aims of a scheduling algorithm in a multi-tasking system? [2]

(d) Describe the **round robin** scheduling algorithm used by a multi-tasking operating system. [2]

3. Embedded systems are used in a car to monitor the car's performance and improve the driving experience, using sensors as input.

Identify **two** features of embedded systems which make them suitable for this task. [2]

The hardware needs to run a specific application reliably	✓ scribble
The hardware needs to run a variety of applications	scribble
The OS and applications can be optimised for the hardware	✓
Applications are held in RAM	
A sophisticated user interface is possible	

4. (a) Explain the term **bytecode**. [2]

(b) Explain how bytecode improves portability. [2]

(c) Explain what is meant by a **virtual machine**. [2]

(d) Explain how the use of the virtual machine protects the user from potential effects of a virus. [2]

5. (a) Explain the difference between systems software and applications software. [2]

- (b) Compare the benefit of disk defragmentation for files stored on a magnetic hard drive and files stored on a solid state drive. [2]

- (c) Cathryn is a teacher who wants her students to be able to manipulate photographs using a graphics package. Explain why she might choose proprietary software for this task. [2]

6. Jacob is writing some assembly code as follows:

```
INP
STA x
INP
ADD x
OUT
HLT
x DAT
```

- (a) What type of translator converts assembly code into machine code? [1]

- (b) Explain why it is easier for Jacob to write in assembly code than to write machine code. [2]

7. Explain the difference between open source software and freeware [2]

8. (a) State what is meant by utility software. [1]

- (b) State and explain **two** examples of utility software used to protect a desktop computer from attacks by malicious code.

[4]

9. A coffee shop owner is looking for some new software to run on her existing till.

- (a) Describe **three** factors the owner should consider when selecting the new application software.

[6]

[Total 50 marks]

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